

# EUROPEAN PATENT OFFICE

## Pat nt Abstracts of Japan

PUBLICATION NUMBER : 08184720  
PUBLICATION DATE : 16-07-96

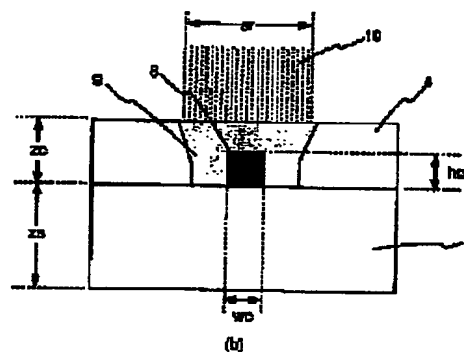
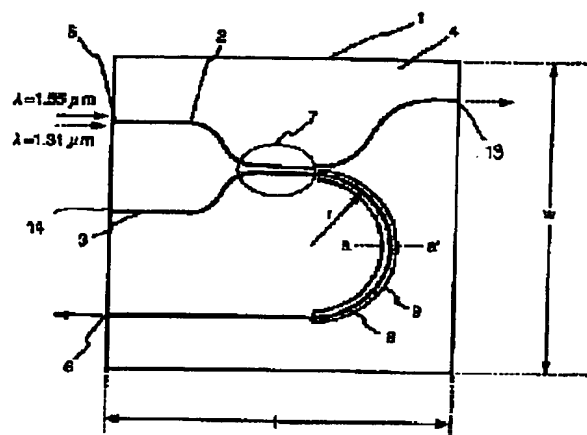
APPLICATION DATE : 28-12-94  
APPLICATION NUMBER : 06328488

APPLICANT : HITACHI CABLE LTD;

INVENTOR : UETSUKA NAOTO;

INT.CL. : G02B 6/122

TITLE : WAVEGUIDE ELEMENT



**ABSTRACT :** PURPOSE: To obtain a waveguide element which is low in bending loss by irradiating the bent optical waveguide of a waveguide element with a laser to increase the specific refractive index difference of the bent optical waveguide part.

**CONSTITUTION:** This waveguide element is formed by constituting two pieces of the optical waveguides 2, 3 composed of core materials consisting of  $\text{SiO}_2\text{-TiO}_2$  on an Si substrate 1. Next, two pieces of the optical waveguides 2, 3 are covered with a clad material consisting of  $\text{SiO}_2\text{-B}_2\text{O}_5\text{-P}_2\text{O}_3$  on the substrate 1. The  $\text{CO}_2$  laser 10 is, thereupon, moved around the bent optical waveguide 8 of the waveguide element along the circumference of the optical waveguide 8 from the front surface direction of the waveguide element. The spot diameter sr of the  $\text{CO}_2$  laser 10 is larger than the width WC of the optical waveguide and, therefore, the irradiated part 9 is so formed as to cover the bent optical waveguide along the optical waveguide when the optical waveguide is irradiated with the  $\text{CO}_2$  laser. The dopant of the irradiated part 9 evaporates or diffuses and the refractive index lowers. The clad having the lower refractive index than the refractive index of the core is, therefore, further lowered in the refractive index by irradiation with the  $\text{CO}_2$  laser.

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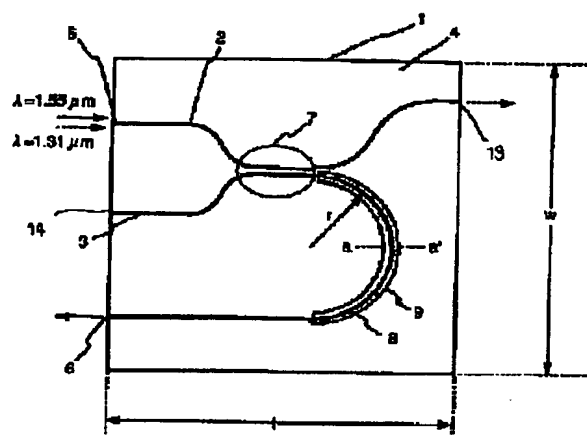
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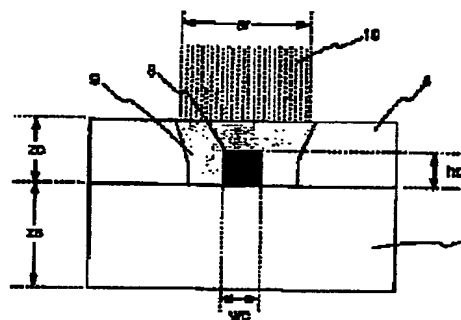
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(a)



(b)

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